



FEB 7 10 10 AM '00

February 3, 2000

Mr. Chuck Schwer
Vermont ANR/DEC
Waste Management Division
103 South Main St. /West Building
Waterbury, VT 05671-0404

RE: Initial Investigation of Suspected Subsurface Petroleum Contamination
Thrasher Residence, Montpelier, Vermont (VTDEC Site #99-2675)

Dear Mr. Schwer:

Enclosed please find the summary report for the site investigation conducted at the above referenced site.

Please contact me if you have any questions or comments.

Sincerely,

Christine Ward
Hydrogeologist

Enclosure

c.: Mr. John Thrasher (w/o enclosure)
GI#129941629

**INITIAL INVESTIGATION OF
SUSPECTED SUBSURFACE
PETROLEUM CONTAMINATION**

**THRASHER RESIDENCE
4 GLINNEY PLACE
MONTPELIER, VT 05562**

VTDEC Site #99-2675
GI #109941629

January 31, 2000

Prepared for

Mr. John Thrasher
4 Glinney Place
Montpelier, VT 05602

Prepared by



20 Commerce Street • P.O. Box 943 • Williston, VT 05495 • 802-865-4288 • Fax 802-657-4129



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I. INTRODUCTION

This report summarizes the initial investigation of suspected subsurface petroleum contamination at the Thrasher Residence on 4 Glinney Place in Montpelier, Vermont (see Site Location Map, Appendix A). In a letter from Chuck Schwer of the Vermont Department of Environmental Conservation (VTDEC) to John Thrasher, dated October 7, 1999, the VTDEC requested that additional work be conducted in order to determine the extent and degree of petroleum contamination in the subsurface beneath the former underground storage tank (UST). This work conducted in accordance with Griffin's *Workplan and Cost Estimate Regarding Petroleum Contamination at 4 Glinney Place, Montpelier, VT*, dated October 13, 1999. The work plan was verbally approved by Chuck Schwer of the VTDEC with the additional requirement that a soil sample be collected from the soil / bedrock interface near the former UST for laboratory analysis of petroleum compounds.

II. SITE BACKGROUND

A. Site History

On August 19, 1999, petroleum contamination was detected at the Site during soil field screening at the routine removal of a 1,000-gallon capacity No. 2 heating oil UST [2]. The removed UST was observed to be in poor condition, with a hole in the bottom. Soil samples collected during the UST closure were screened for volatile organic compounds (VOCs) using an HNuTM systems model HW-101 photoionization detector (PID) equipped with a 10.2 eV lamp.

The PID measurements of soils collected from the UST excavation are depicted on the cross-section in Appendix A. This cross-section illustrates that elevated PID readings were measured directly below the former UST at approximately 5 feet below grade. No VOCs were measured with the PID from underlying soils collected at 6 to 6.5 feet below grade. Bedrock was encountered in the excavation at approximately 6.5 feet below grade.

The highest PID measurement of 100 parts per million (ppm) was from a soil sample collected approximately one foot south of the southern end of the former UST at a depth of approximately 5 feet below grade. Further excavation on the south end of the UST was conducted in an attempt to determine the lateral extent of contamination in the presumed downgradient direction. A soil sample collected approximately two feet further south of the 100 ppm reading and at the same depth of approximately 5 feet below grade had a PID measurement of 30 ppm. The PID measurements appeared to decrease laterally, however given the steep downward slope of the ground surface south and east of the former UST location, it was determined that further excavation to dig to clean (i.e., soil PID readings < 1 ppm) was not possible.

B. Site Geology

According to the Surficial Geologic Map of Vermont [3], the Site is underlain by glacial till. Bedrock below the Site is mapped as the Northfield formation, consisting mainly of dark gray to black quartz-sericite slate or phyllite [4].

The surficial soil encountered during the UST closure excavation consisted primarily of dense gray brown silt and weathered rock fragments [2]. Bedrock was encountered in the UST excavation at approximately 6.5 feet below grade. There is exposed bedrock at the surface immediately northeast of the former UST location.

III. INVESTIGATIVE PROCEDURES

To further define the extent of subsurface petroleum contamination in the area of the former UST, the following investigative tasks were undertaken: hand augered soil borings; soil sample collection and analyses for petroleum related constituents; and a sensitive receptor survey that included screening the basement air space. Physical site constraints precluded the use of a drill rig to advance the soil borings at this site.

A. Soil Borings

Shallow soil borings were advanced with a hand auger downgradient from the former UST location, with respect to the ground surface topography, on December 2, 1999. A boring was not advanced directly in the tank pit for the former UST, since a new UST was installed in the same location as the former UST.

Soil boring #1 was advanced near the southern end of the former UST. Soil samples were collected at one foot intervals from grade to three feet below grade, and at half-foot intervals from three feet to six and one-half feet below grade where refusal was encountered. The soil samples were screened for the presence of VOCs using an HNu™ systems Model HW-101 PID. No VOCs were detected with the PID at concentrations exceeding 1 ppm from the soils collected from soil boring #1. The soil sample collected at the bottom of this boring was submitted for laboratory analysis as described below in Section III B.

Soil boring #2 was advanced over the edge of the slope and approximately ten feet south of soil boring #1. Soil samples were collected at one foot intervals from one and one-half feet below grade to four and one-half feet below grade. No VOCs were detected with the PID.

Soil boring #3 was advanced approximately fifty feet over the embankment to a depth of one and one-half feet. No VOCs were detected with the PID



Soil boring #4 was advanced approximately one hundred feet over the embankment to a depth of one and one-half feet. No VOCs were detected with the PID

Soil boring #5 was advanced approximately twelve feet east of soil boring #1 and along the top of the slope. Soil samples were collected at one foot intervals from two and one-half feet below grade to four and one-half feet below grade, where bedrock refusal was encountered. No VOCs were detected with the PID.

Visual inspection of the embankment on December 2, 1999, revealed no evidence of petroleum contamination such as seeps, staining, or distressed vegetation.

B. Soil Sample Collection and Analysis

The soil sample collected from the bottom of soil boring #1 (6.5 below grade) was submitted to Endyne, Inc. of Williston, Vermont, for analysis by EPA Method 8021B for the presence of benzene, toluene, ethylbenzene, and xylenes (BTEX), methyl tertiary butyl ether (MTBE), naphthalene, 1,3,5-trimethylbenzene (TMB) and 1,2,4-TMB, and for total petroleum hydrocarbons (TPH) by EPA Method 8015-DRO (diesel range organics). The laboratory analysis report is contained in Appendix B.

No targeted petroleum compounds were reported above the sample specific detection limits in the soil sample collected from soil boring #1. No unidentified peaks (UIPs) of petroleum compounds were reported for the soil sample from soil boring #1.

C. Sensitive Receptor Survey

A qualitative risk assessment was conducted to identify known and potential receptors of the contamination detected at the Site. A visual survey was conducted during the UST closure inspection on August 19, 1999, as well as during the site investigation on December 2, 1999. Based on these observations, a determination of the potential risk to identified receptors was made.

The soil in the vicinity of the former UST is a receptor of the contamination detected. VOCs were not measured from soils collected from soil borings advanced in the downgradient direction from the former UST with respect to the ground surface topography. This information, along with the results of PID screening during the UST closure indicates that the extent of adsorbed contamination is limited to the direct vicinity of the former UST pit.

Bedrock was encountered in the excavation for the former UST at a depth of approximately 6.5 feet below grade. The base of the former UST was approximately 5 feet below grade. The risk to the bedrock posed by the petroleum impact in the vicinity of former UST is considered limited



based on the non-detection of VOCs with PID in soil samples collected below the former UST and directly above the bedrock surface.

Groundwater was not encountered in the overburden soils during the UST closure inspection or in the shallow soil borings. The risk to the groundwater posed by the petroleum impact in the vicinity of former UST is considered limited based on the non-observance of groundwater in the overburden. The potential exists for adsorbed petroleum contamination to be transported to the groundwater during recharge events (i.e., rain storms). However, the risk of impact to the groundwater is still considered limited given the minimal strength of the source area based on the soil PID measurements.

Griffin screened the indoor basement air space of the Thrasher Residence for the presence of VOCs using an HNu™ systems Model HW-101 PID on August 19, 1999, and on December 2, 1999. The Thrasher Residence basement is constructed of stone and concrete walls with a stone and dirt floor. No VOC readings were detected with the PID throughout the basement. The risk to the indoor air posed by the petroleum impact in the vicinity of former UST is considered minimal based on the non-detection of VOCs in the house with the PID and based on the minimal strength of the source area. Based on the ground surface topography, surface storm water runoff through the soils surrounding the former UST location would likely be in a south to east direction and away from the basement foundation.

The area is served by municipal water supplies. There are no known private or public water supply wells within a one-half mile radius of the Thrasher Residence.

The nearest surface water is the southerly flowing North Branch, located approximately 700 feet southeast of the former UST. The North Branch discharges into the Winooski River. The risk to North Branch is considered minimal given the non-detection of VOCs by field screening methods in soil borings near the former UST and given the sufficient distance between the former UST and the river.

IV. CONCLUSIONS

Based on the results of this investigation at the Thrasher Residence, Griffin presents the following conclusions:

- 1) The source of petroleum contamination detected in soils at the Site has been attributed to the former 1,000-gallon No. 2 heating oil UST. A hole was reported in the former UST upon removal on August 19, 1999, [2]. The volume of product released is unknown.
- 2) PID measurements from soils collected during the UST closure in August 1999 indicate that adsorbed petroleum compounds existed in the soils in the immediate vicinity of the former No. 2 heating oil UST. With the source UST system eliminated, it is expected



that adsorbed petroleum compound concentrations will decrease over time with the progressive action of natural mitigative processes including biodegradation, volatilization, and diffusion.

- 3) Hand augered soil borings were advanced downgradient, with respect to the ground surface topography, from the former UST. No VOCs were measured with the PID at levels exceeding 1 ppm in the soil samples collected from the borings. This information, along with the results of PID screening during the UST closure indicates that the extent of adsorbed contamination is limited to the direct vicinity of the former UST pit.
- 4) The soil encountered in the UST excavation and the soil borings consisted primarily of dense silt. This soil of relatively limited permeability will likely limit the migration of the detected petroleum contamination, however the source area contamination may be persistent over time.
- 5) Groundwater was not encountered in the UST excavation in the overburden soils over the bedrock which was encountered at 6.5 feet below grade.
- 6) The site and surrounding properties are serviced by municipal water and not by on-site water supply wells.
- 7) No VOCs were measured with the PID in the basement air space of the Thrasher Residence.

V. RECOMMENDATIONS

Based on the results of this site investigation, Griffin recommends that the Thrasher Residence site in Montpelier, Vermont be considered for closure and be removed from the VTDEC Active Hazardous Waste Sites List. This recommendation is offered based upon achievement of the following closure criteria, as per the VTDEC Site Management Activity Completed (SMAC) Checklist (dated December 1, 1997):

- 1) The source(s), nature, and extent of the petroleum contamination at the site has been adequately defined.

See Conclusions #1, #2, and #3.

- 2) Source(s) has been removed, remediated, or adequately contained.

See Conclusions #1.



- 3) Levels of contaminants in soil and groundwater shall be stable, falling, or non-detectable.

See Conclusion #2, #3, and #5.

- 4) Groundwater enforcement standards are met at the following compliance points:

Any point of present use of groundwater as a source of potable water: See Conclusions #5 and #6.

Any point at or within the boundary of any Class I groundwater area: The Thrasher Residence is not within a Class I groundwater area.

Any point at the boundary of the property on which the contaminant source is located: See Conclusion #5 and #6.

- 5) Soil guideline levels are met. If not, engineering or institutional controls are in place.

See Conclusion #3 and #4.

- 6) No unacceptable threat to human health or the environment exists on site.

See Conclusions #3, #5, #6, and #7.

- 7) Site meets RCRA requirements.

Available records indicate that the Thrasher Residence is not in violation of the Resource Conservation and Recovery Act (RCRA) as defined in 40 CFR 264.

- 8) Site meets CERCLA requirements.

Available records indicate that the Thrasher Residence is not in violation of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as defined in 40 CFR 300.



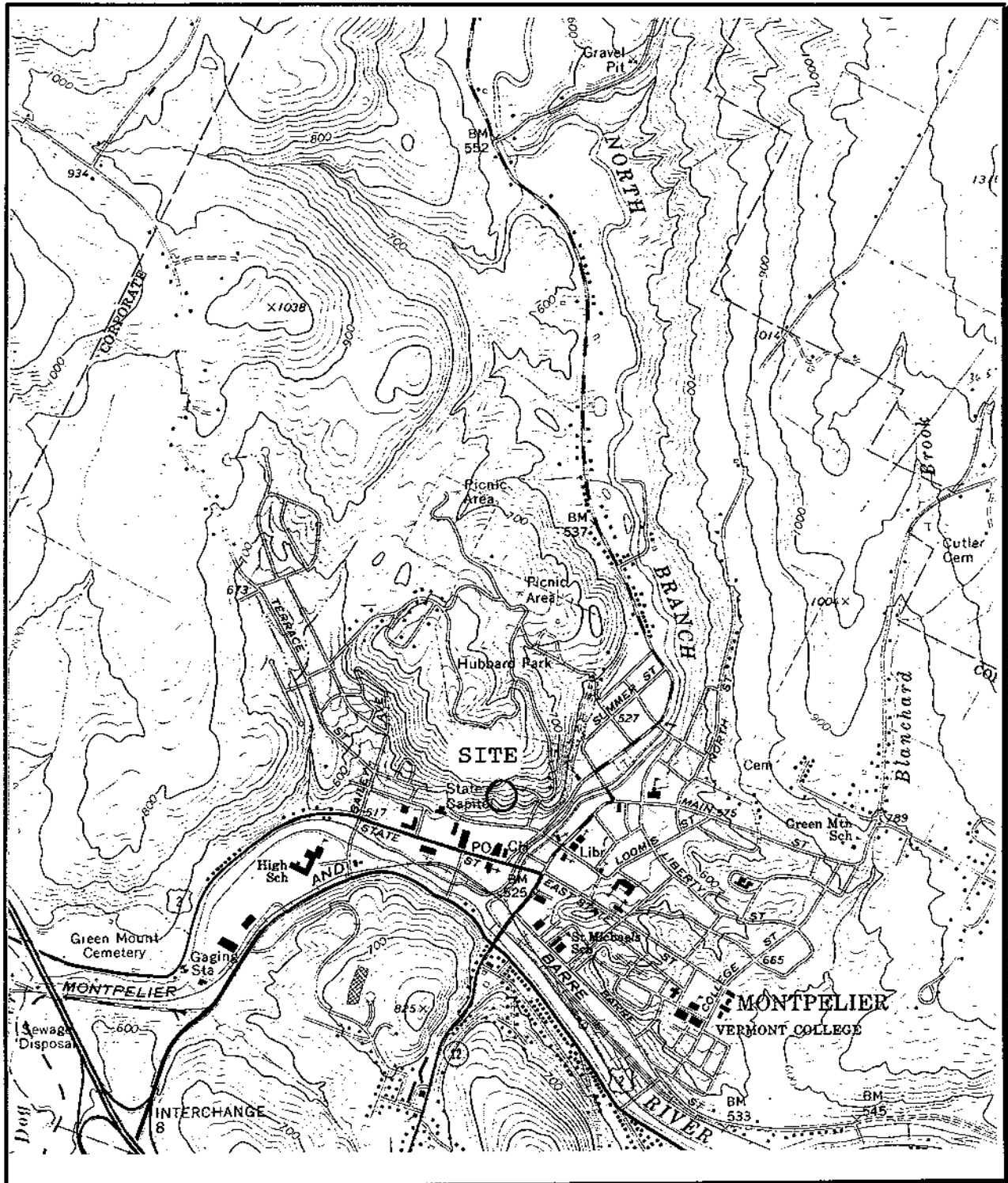
VI. REFERENCES

1. USGS 7.5 Minute Topographic Map, Montpelier, VT, dated 1968.
2. Griffin International, August 24, 1999, *Thrasher Residence, Montpelier, Vermont - UST Closure Inspection*, letter report to Ms. Sue Thayer, Vermont Department of Environmental Conservation, Waste Management Division.
3. Doll, Charles G., ed., 1970, *Surficial Geologic Map of Vermont*, Vermont Geological Survey.
4. Doll, Charles G., ed., 1961, *Centennial Geologic Map of Vermont*, Vermont Geological Survey.

Appendix A

Maps

- 1) Site Location Map**
- 2) Site Sketch**
- 3) Tank Closure Soil PID Measurement Cross Section**



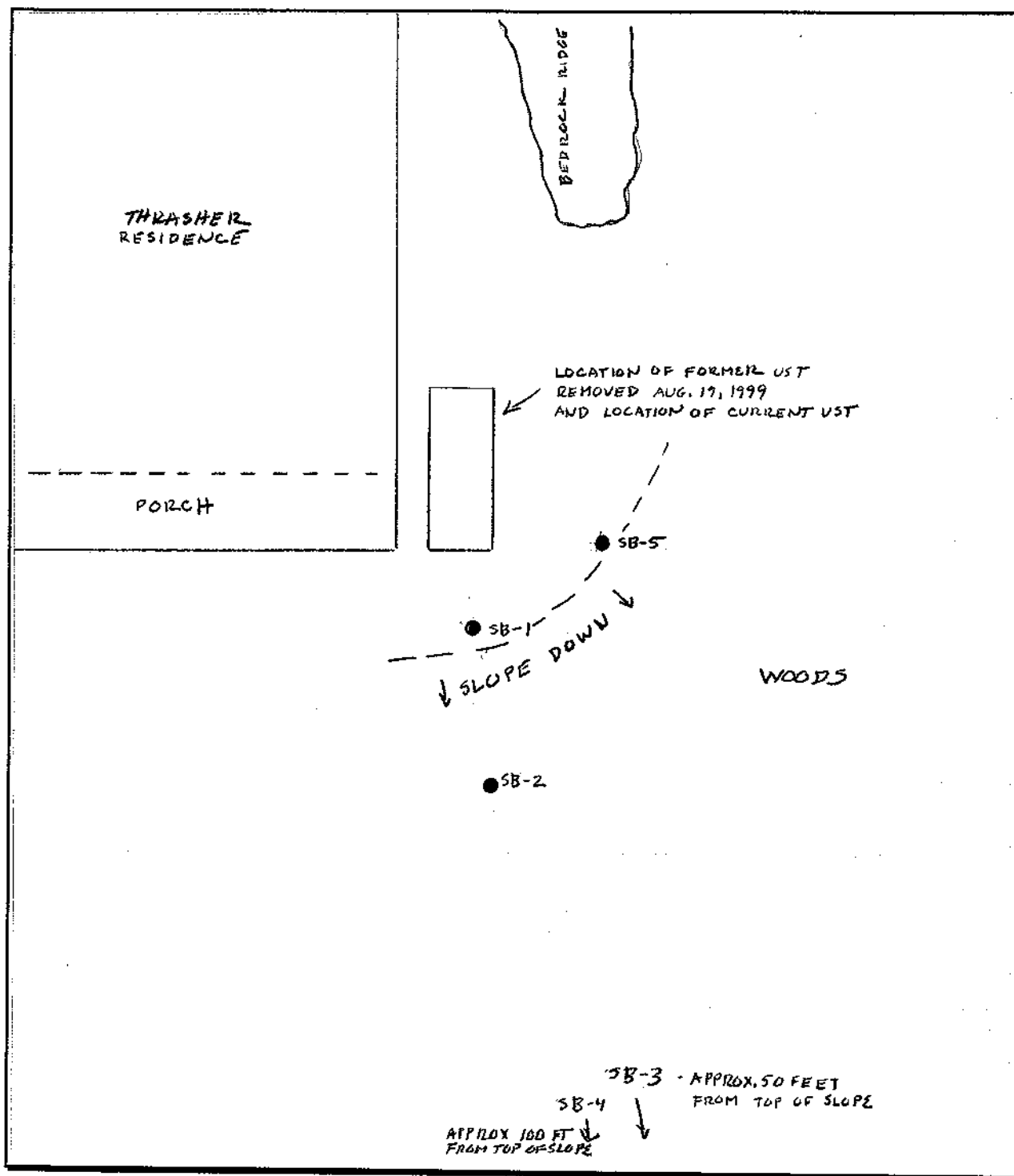
SITE LOCATION MAP - THRASHER RESIDENCE

Montpelier, Vermont

Source: USGS 7.5 minute quadrangle: Montpelier, VT, dated 1968.

Scale: 1:24,000





SITE SKETCH - THRASHER RESIDENCE (VTDEC #99-2675)

Montpelier, Vermont

Source: Griffin field observations 8/19/99 and 12/2/99.

Scale: 1" ~ 10'

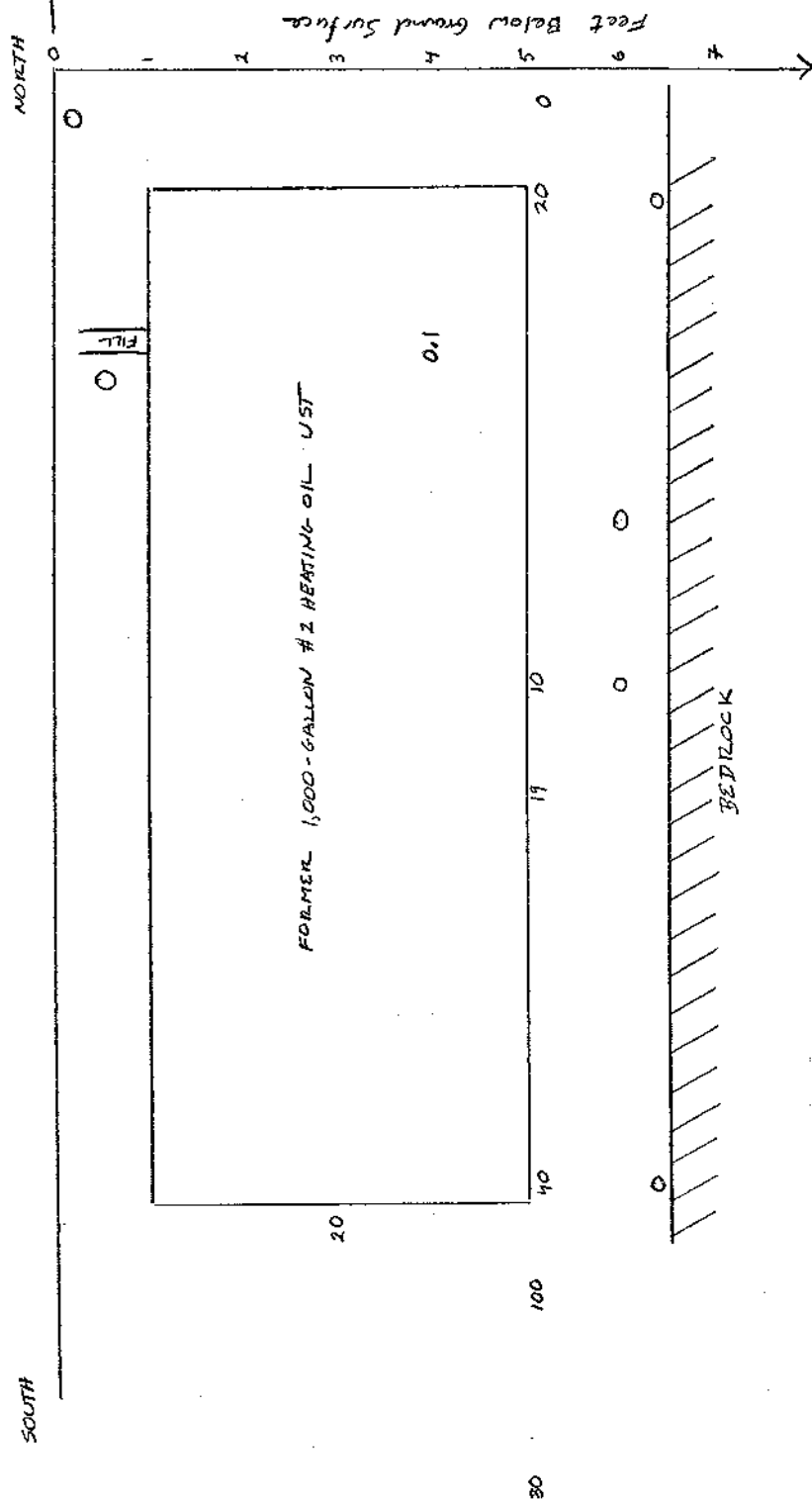




19 Commerce Street
P.O. Box 943
Williston, VT 05495
Ph/Fax (802) 865-4288
E-mail: griffint@together.net

JOB _____
SHEET NO. _____ OF _____
CALCULATED BY GW DATE _____
CHECKED BY _____ DATE _____
SCALE 1" = 20'

TANK CLOSURE SOIL PID MEASUREMENT CROSS-SECTION



TANK CLOSURE CONDUCTED 8/19/99
PID MEASUREMENTS REPORTED IN PARTS PER MILLION (PPM)

Appendix B

Analytical Laboratory Report



ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

CLIENT: Griffin International

ORDER ID: 5183

PROJECT: Thrasher Res./#109941629

DATE RECEIVED: December 3, 1999

REPORT DATE: December 9, 1999

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. Different groups of analyses may be reported under separate cover.

All samples were prepared and analyzed by requirements outlined in the referenced methods and within the specified holding times.

All instrumentation was calibrated with the appropriate frequency and verified by the requirements outlined in the referenced methods.

Blank contamination was not observed at levels affecting the analytical results.

Analytical method precision and accuracy was monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits, unless otherwise noted.

Reviewed by,

Harry B. Locker, Ph.D.
Laboratory Director

enclosures



ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

CLIENT: Griffin International
PROJECT: Thrasher Res./#109941629
REPORT DATE: December 9, 1999

ORDER ID: 5183
DATE RECEIVED: December 3, 1999
SAMPLER: JR
ANALYST: 725

Ref. Number: 148235

Site: Soil Sample #1

Date Sampled: December 2, 1999 Time: 1:25 PM

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Method</u>	<u>Analysis Date</u>
MTBE	< 20.0	ug/kg, dry	SW 8021B	12/7/99
Benzene	< 10.0	ug/kg, dry	SW 8021B	12/7/99
Toluene	< 10.0	ug/kg, dry	SW 8021B	12/7/99
Ethylbenzene	< 10.0	ug/kg, dry	SW 8021B	12/7/99
Xylenes, Total	< 20.0	ug/kg, dry	SW 8021B	12/7/99
1,3,5 Trimethyl Benzene	< 10.0	ug/kg, dry	SW 8021B	12/7/99
1,2,4 Trimethyl Benzene	< 10.0	ug/kg, dry	SW 8021B	12/7/99
Naphthalene	< 50.0	ug/kg, dry	SW 8021B	12/7/99
UIP's	0.		SW 8021B	12/7/99
Percent Solid	88.	%	SW 8021B	12/7/99
Surrogate 1	111.%	%	SW 8021B	12/7/99



ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

CLIENT: Griffin International
PROJECT: Thrasher Res./#109941629
REPORT DATE: December 10, 1999

ORDER ID: 5183
DATE RECEIVED: December 3, 1999

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. Different groups of analyses may be reported under separate cover.

All samples were prepared and analyzed by requirements outlined in the referenced methods and within the specified holding times.

All instrumentation was calibrated with the appropriate frequency and verified by the requirements outlined in the referenced methods.

Blank contamination was not observed at levels affecting the analytical results.

Analytical method precision and accuracy was monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits, unless otherwise noted.

Reviewed by,

Harry B. Locker, Ph.D.
Laboratory Director

enclosures



ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
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FAX 879-7103

LABORATORY REPORT

CLIENT: Griffin International

ORDER ID: 5183

PROJECT: Thrasher Res./#109941629

DATE RECEIVED: December 3, 1999

REPORT DATE: December 10, 1999

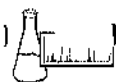
SAMPLER: JR

Ref. Number: 148235

Site: Soil Sample #1

Date Sampled: December 2, 1999 Time: 1:25 PM

<u>Parameter</u>	<u>Result</u>	<u>Unit</u>	<u>Method</u>	<u>Analysis Date</u>	<u>Analyst</u>
TPH 8015 DRO	< 5.00	mg/Kg	SW 8015B	12/10/99	128



ENDYNE, INC.

160 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

CHAIN-OF-CUSTODY-RECORD

34825

JOB# 109941629

Project Name: THRASHER RESIDENCE MONTPELIER VT.		Reporting Address: GRIFFIN		Billing Address: GRIFFIN	
Endyne Order ID: (Lab Use Only)	-O -I -S	Company: Contact Name/Phone #: GRIFFIN CW		Sampler Name: Phone #: J. ROCKLIN	

Ref # (Lab Use Only)	Sample Identification	Matrix	G R A B	C O M P	Date/Time	Sample Containers		Field Results/Remarks	Analysis Required	Sample Preservation	Rush
						No.	Type/Size				
	SOIL SAMPLE #1	SOIL	✓		12-2-99 1325	2	4oz		8021B + 8015 DRO	COOL	

Relinquished by: <i>[Signature]</i>	Date/Time: 12-2-99	Received by: <i>[Signature]</i>	Date/Time: 12-3-99 8:30am	Received by: <i>[Signature]</i>	Date/Time: 12-3-99
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New York State Project: Yes ☐ No ☐

Requested Analyses

1	pH	6	TKN	11	Total Solids	16	Sulfate	21	1664 TPH/FOG	26	8270 PAH
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	8015 GRO	27	PP13 Metals
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	8015 DRO	28	RCRA8 Metals
4	Nitrite N	9	BOD	14	Turbidity	19	8021B	24	8260/8260B	29	
5	Nitrate N	10	Alkalinity	15	Conductivity	20	8010/8020	25	8270 B/N or Acid	30	
31	Metals (As, Pb, Total, Diss.) Ag, Al, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Mo, Na, Ni, Pb, Sb, Se, Si, Sr, Ti, Tl, V, Zn										
32	TCLP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides)					33					
34	Other										